AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A device for sensing a target analyte in a sample comprising:

(a) an optical ~~conduit~~fiber having a proximal end and a distal end;

(b) an optical system at the proximal end of the optical ~~conduit~~fiber comprising at least one electromagnetic energy emitter and at least one electromagnetic energy detector;

(c) a sensing element attached to the distal end of the optical ~~conduit~~fiber and in optical connectivity with the optical fiber, said sensing element comprising (i) at least one periplasmic binding protein capable of specifically binding with at least one target analyte and at least one reporter group associated with the periplasmic binding protein and (ii) a polymeric matrix, wherein the periplasmic binding protein and reporter group are entrapped within or attached to said polymeric matrix, wherein said matrix permits said periplasmic binding protein to retain conformational mobility, and wherein said matrix is adapted to transduce a luminescence change of said reporter group upon specific binding of the periplasmic binding protein to the target analyte; and

(d) a tip that houses and protects said optical ~~conduit~~fiber and said sensing element within said tip.

2. (canceled).

3. (previously presented): The device of claim 1, wherein the tip is selected from the group consisting of a needle and a catheter.

4. (canceled).

5. (canceled).

6. (original): The device of claim 1, further comprising one or more connectors.

7. (currently amended): The device of claim 6, wherein the sensing element is attached to the proximal end of the optical ~~conduit~~fiber through said one or more connectors.

8. (canceled).

9. (canceled).

10. (canceled).

11. (canceled).

12. (previously presented): The device of claim 1, wherein the sensing element is covalently attached to the polymer matrix.

13. (canceled).

14. (canceled).

15. (canceled).

16. (canceled).

17. (canceled).

18. (canceled).

19. (currently amended): The device of claim 1, wherein ~~the optical conduit comprises at least one~~ said optical fiber comprises silica.

20. (original): The device of claim 1, wherein the electromagnetic energy emitter is selected from the group consisting of an arc lamp, light emitting diode, and laser diode.

21. (original): The device of claim 1, wherein the electromagnetic energy detector is a photodiode, photomultiplier tube, or charge coupled device.

22. (original): The device of claim 1, wherein said optical system further comprises optical elements adapted to distinguish multiple wavelengths.

23. (original): The device of claim 22, wherein said optical elements further comprise optical filters, dichroic components, holographic components, or combinations thereof.

24. (original): The device of claim 21, wherein said electromagnetic energy detector is adapted to detect energy emitted by said reporter group substantially continuously.

25. (original): The device of claim 21 wherein said electromagnetic energy detector is adapted to detect energy emitted by said reporter group periodically.

26. (original): The device of claim 1, wherein said optical system further comprises electrical or optoelectronic elements for modulation of the signal from the electromagnetic energy emitter.

27. (original): The device of claim 1, wherein said optical system further comprises electrical or optoelectronic elements for modulation of the luminescence signal received by the electromagnetic energy detector.

28. (original): The device of claim 1, wherein the optical system is adapted to measure the intensity of the luminescence signal.

29. (original): The device of claim 1, wherein the optical system is adapted to measure the wavelength of the luminescence signal.

30. (original): The device of claim 1, wherein the optical system is adapted to measure the lifetime of the luminescence signal,

31. (original): The device of claim 1, wherein the optical system is adapted to measure the polarization of the luminescence signal.

32. (original): The device of claim 1, wherein the optical system is adapted to measure the energy transfer efficiency of the reporter group.

33. (canceled).

34. (previously presented): The device of claim 1, wherein the device comprises at least one reference group, and wherein the at least one reference group is associated with a protein.

35. (original): The device of claim 1, wherein said sensing element is further adapted to be inserted into or through the skin of a patient.

36. (previously presented): The device of claim 1, wherein the device comprises at least one reference group, and wherein the at least one reporter group and the at least one reference group are excited at the same wavelengths.

37. (previously presented): The device of claim 1, wherein the device comprises at least one reference group, and wherein the at least one reporter group and the at least one reference group are excited at different wavelengths.

38. (previously presented): The device of claim 1, wherein the device comprises at least one reference group, and wherein the luminescence of the at least one reporter group and the luminescence of the at least one reference group are detected at different wavelengths.

39. (previously presented): The device of claim 1, wherein the device comprises at least one reference group, and wherein the luminescence of the at least one reporter group and the luminescence of the at least one reference group are detected at the same wavelengths.

40. (original): The device of claim 1, wherein the reporter group comprises a pair of organic dyes chosen so that the energy transfer efficiency between the pair changes upon analyte binding.

41. (original): The device of claim 1, wherein the reporter group comprises a pair of fusion proteins chosen so that the energy transfer efficiency between the pair changes upon analyte binding.

42. (original): The device of claim 1, wherein the reporter group comprises an organic dye and a fusion protein chosen so that the energy transfer efficiency between the organic dye and the fusion protein changes upon analyte binding.

43. (previously presented): The device of claim 1, where said periplasmic binding protein is a glucose-galactose binding protein.

44. (previously presented): The device of claim 1, wherein said target analyte is glucose.

45. (previously presented): The device of claim 3, wherein the tip is a needle.

46. (previously presented): The device of claim 3, wherein the tip is a catheter.

47. (new): The device of claim 1, wherein said polymeric matrix is covalently attached to said distal end of said optical fiber.

48. (new): The device of claim 47, wherein said covalent attachment occurs through functional amine groups on the surface of said optical fiber.